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deckplate

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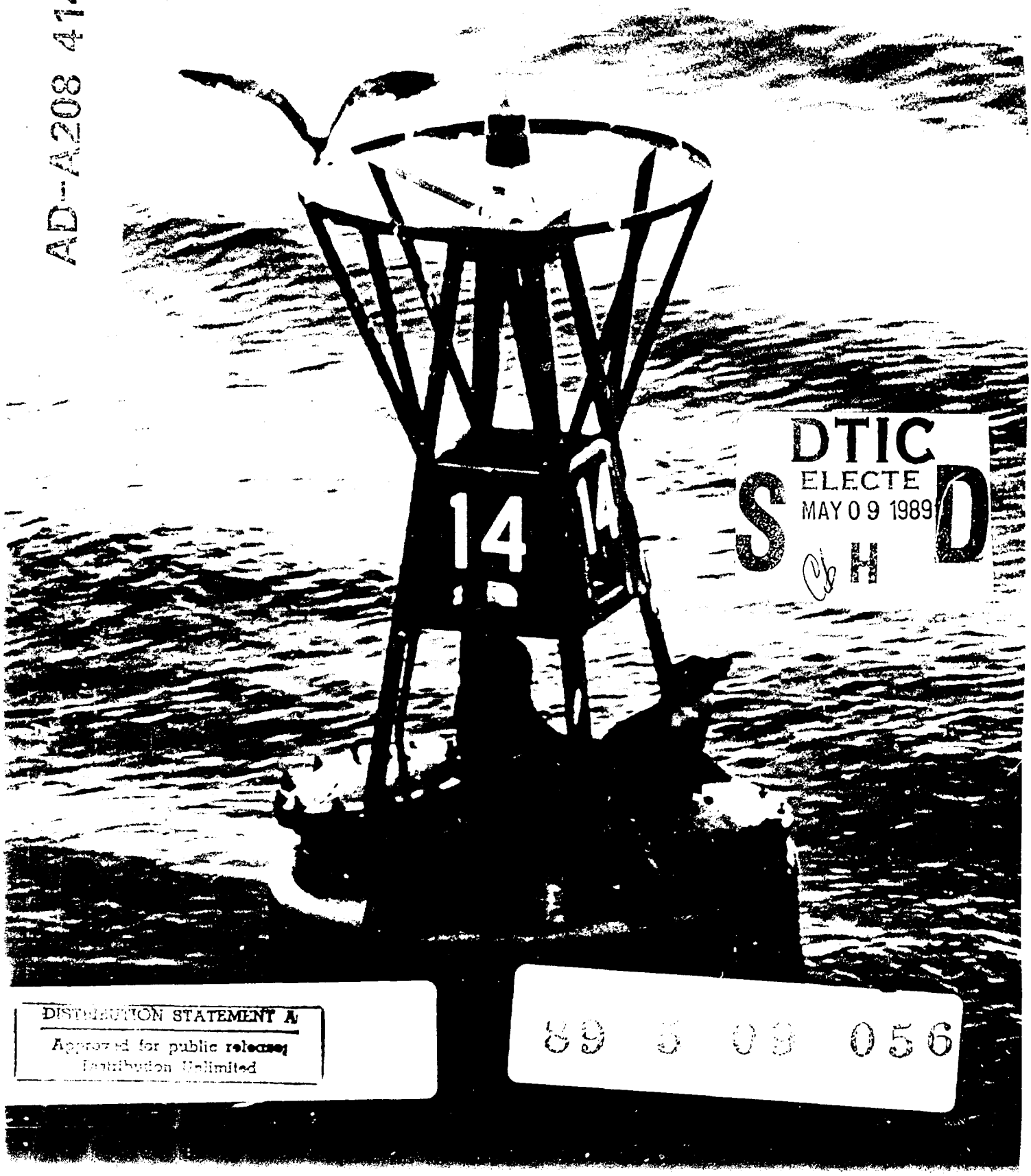

Volume 9 Number 3

deckplate

Naval Sea Systems Command
May-June 1989

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contents

Photographs:

Front Cover: Three seals claim a buoy as their private island off San Diego, California.

Back Cover: A crewman does some painting on the guided-missile destroyer USS MAHAN (DDG-42).

WHEN IS A SEAL SUITABLE?

Rubber and other resilient seals are devices which control the escape of fluids or gases, and prevent the entry of foreign materials. Seals and related items, such as gaskets and packings, are used in nearly all equipment and every system onboard ships.

This article answers some frequently asked questions about determining the fitness of rubber seals based on age and condition. [Chapter 078 of the Naval Ships' Technical Manual (NSTM) is being updated to provide more information on the shelf life of seals, packings and gaskets.]

1) **What is shelf life?** This is the period of time during which a properly packaged item should be good for unrestricted use.

2) **Does shelf life apply to installed seals?** No. No age requirements are normally placed on seals once they are installed in components or systems on Navy ships.

3) **Why do seals have shelf-life requirements?** Rubber materials can deteriorate with age although proper packaging minimizes this deterioration. Shelf life requirements help ensure a satisfactory performance on the part of seals after they are installed.

4) **How does one determine if a seal is suitable for installation?** The most important factor is the actual condition of the seal, as determined by visual and touch tests. Secondly, one should find out if the seal has exceeded its expected or suggested shelf life. Other factors must be considered when the age of a seal exceeds its suggested shelf life.

5) **How are visual and touch tests conducted?** Determine by sight and feel if the rubber is pliable without any signs of nicks, cuts, cracking, discoloration, flaking, stickiness, brittleness and cracking. Such tests should be conducted on every seal to be installed, regardless of age.

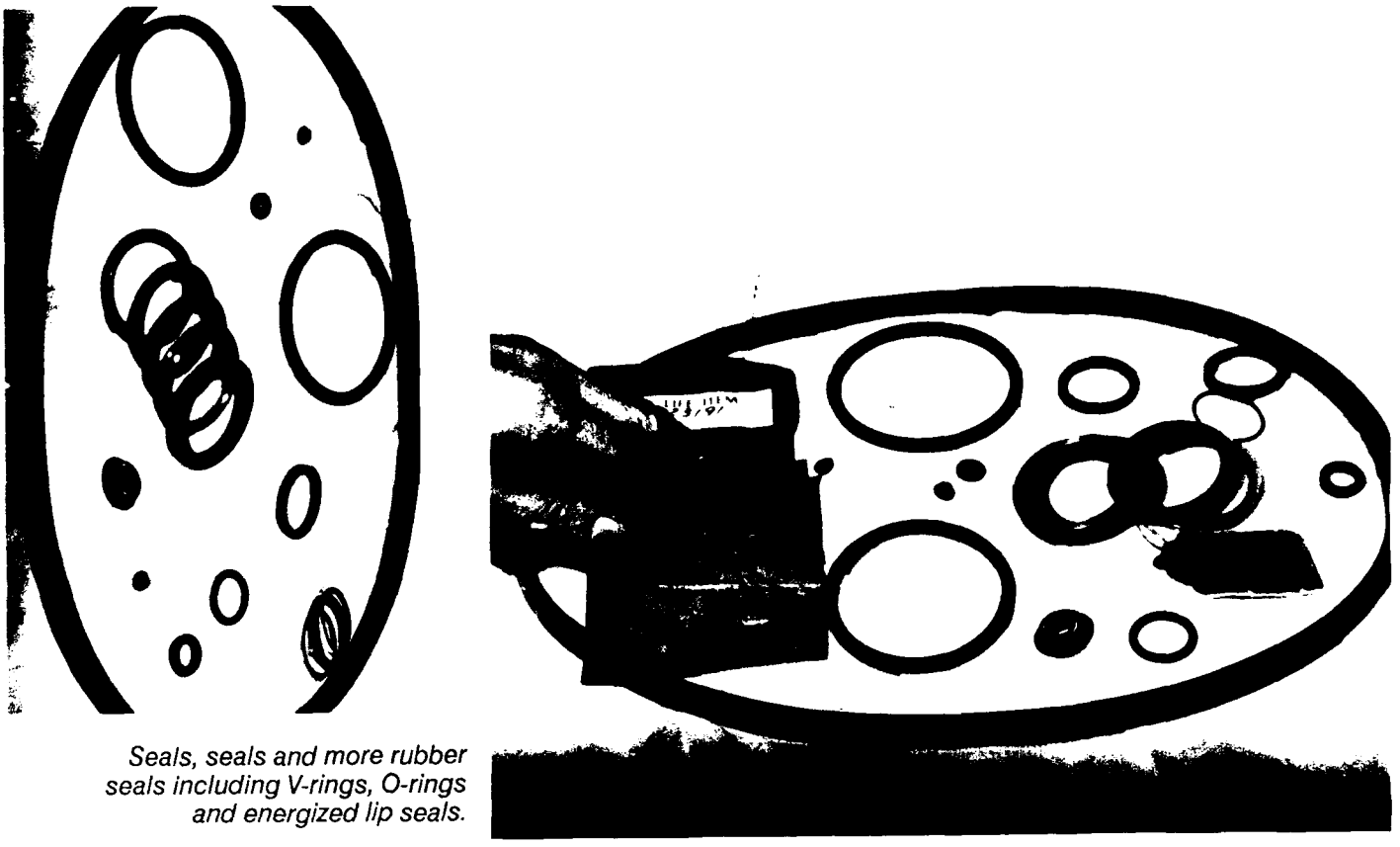
6) **How does one determine if seals are within their shelf-life requirements for unrestricted use?** In many cases, this information is on the seal packages. Most seals fall into one of two categories.

   In the first category are seals with non-extendable shelf lives, usually of five years or less. Packages for these seals are marked with an "Expiration Date," which is the last date the seals should be used. Non-extendable items should be removed from the supply system when their expiration dates are exceeded.

   In the second category are seals with expected shelf lives of more than five years with no definite expiration dates. However, the packages may be marked with "Use Before" or "Use By" dates to indicate their suggested shelf lives. When there is no date specified, reference documents should be consulted if a seal is more than eight years old.

7) **What documents should be consulted if no date is specified?** NSTM 078 contains the shelf lives of some commonly used o-rings. For other seals, check MIL-HDBK-695, "Rubber Products: Recommended Shelf Life". This handbook provides information on the expected shelf life of rubber products identified by common and trade names, military, federal and recognized industry specifications and standards. (MIL-HDBK-695 may be ordered from the Naval Publications and Forms Center in Philadephia, PA.)

8) **How does one determine the age of a seal?** The age is calculated by the "cure" date on the package. This indicates when the seal was manufactured. In its absence, the contract date on the package may be used. All seals without cure dates should be reported to the inventory control point, which, for most seals, is the Defense Industrial Supply Center. NSTM 078 describes the reporting procedure.



Seals, seals and more rubber seals including V-rings, O-rings and energized lip seals.

9) **If a seal is under eight years of age, does its expected shelf life have to be determined?** No. If a seal does not have an "expiration" date, it will have an expected shelf life of at least eight years. Therefore, a seal less than eight years old will be within its expected shelf life.

10) **Can seals be used when they are older than their suggested shelf lives?** Yes, seals without definite expiration dates are not automatically removed from the supply system. For these seals, the shelf lives in MIL-HDBK-695 are only recommendations, and they can be used for longer periods, subject to certain requirements in NSTM 078.

11) **What are the requirements for using overage seals?** They must be properly sealed in their original packages, must pass the visual and touch test, and be operationally tested after installation to verify that they perform properly.

However, if specific system and/or equipment manuals prohibit the use of seals after their suggested shelf lives, they should not be used.

12) **What if the suggested shelf life of a seal cannot be determined?** The rubber material in many proprietary seals is not identified and sometimes the ages are unknown. In such cases, they may be used if they pass the tests for overage seals.

13) **Can seals ever be used after their expiration dates?** Normally, they should be discarded. However, there are a number of nitrile rubber seals which had their shelf lives increased from five to ten years. MIL-HDBK-695 was revised to reflect this increase, but not all of the seal packages were remarked to indicate the change. NOTE: MIL-HDBK-695 and NSTM 078 requirements take precedence over package markings.

CONCLUSION

While rubber materials are subject to deterioration with age, most seals are not removed from the supply system when they exceed their recommended shelf lives. Therefore, it is the responsibility of the installer to verify that a particular seal is suitable for use. Installers should be familiar with the guidance and requirements of NSTM 078 to do this.

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MAKE YOURSELF COMFORTABLE

Are you and your shipmates bothered by uncomfortable temperatures or humidities in your work and living spaces? If so, some simple maintenance and/or troubleshooting steps may be all that is necessary to return conditions to normal.

The System

Following is a simplified view of how a heating/ventilation/air conditioning (HVAC) system works aboard ship.

Ventilation fans circulate air throughout the ship, both to supply fresh air and exhaust stale or contaminated air. Fresh air is obtained from an exterior-to-hull source for surface ships and snorkeling/surfaced ships, and from replenishment sources for submerged submarines.

To understand the characteristics of air, compare it to a sponge. Heat it and it expands to absorb moisture. Cool it and it shrinks to squeeze out moisture.

To maintain supply air at a comfortable relative humidity level of 35 to 50 percent, remove moisture content exceeding this range by passing the air over a cooling coil, similar in construction to an automobile radiator.

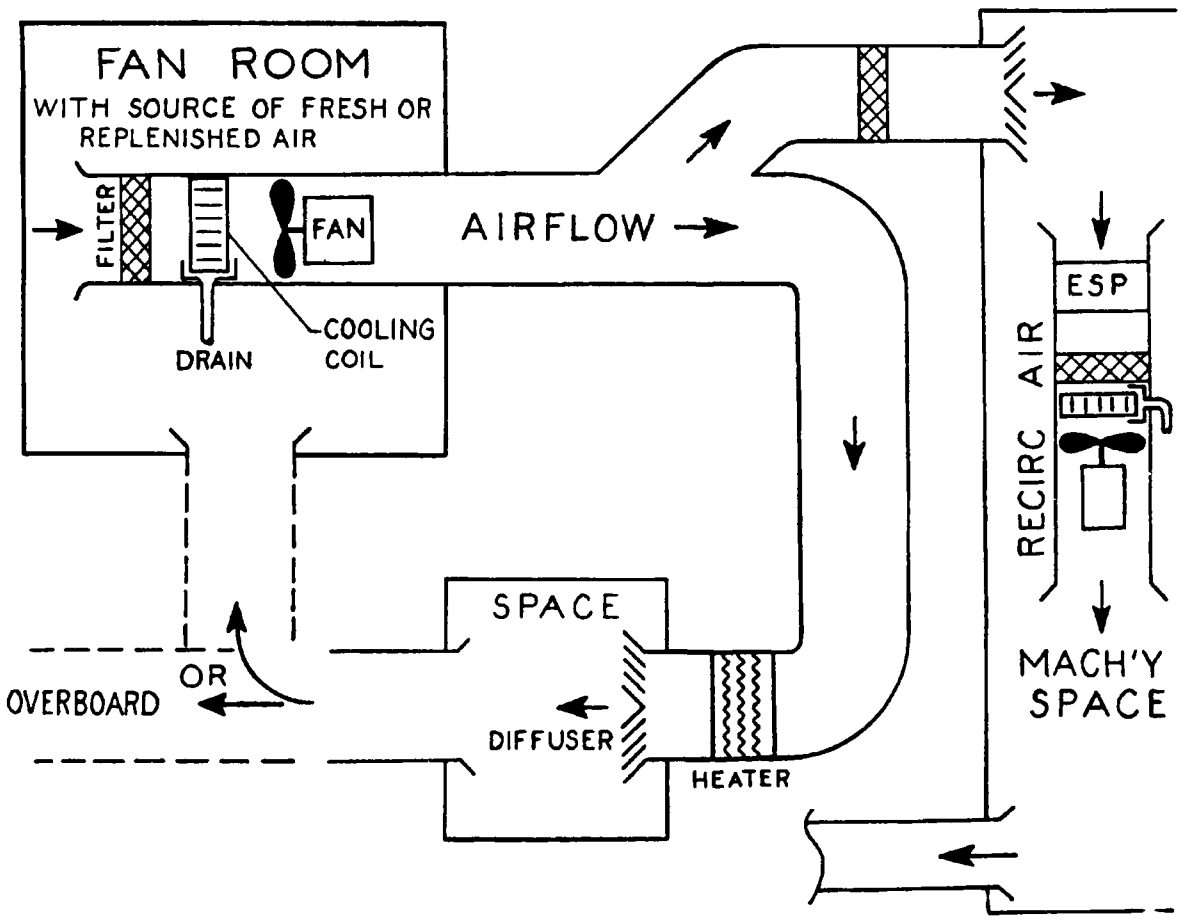
Chilled water circulates through the coil to maintain the temperature needed to cool the air and squeeze out excessive moisture. The coil temperature is regulated by the temperature and amount of the chilled water flowing through.

Following this stage, the cooled and dehumidified air continues on through various ducts to individual compartments. Before entering a compartment, it passes over a duct heater which warms it to the thermostat setting.

Filters and electrostatic precipitators scrub particles from the air throughout the ventilation system.

Maintenance

A problem existing in any one component in the HVAC system can affect the quality of air you breathe. Therefore, basic maintenance steps must be followed to ensure optimum performance of the system.



1) **KEEP AIRSIDES OR FINS OF COOLING COILS CLEAN AND FREE OF ANY BLOCKAGES.**

   Accumulations of lint, dirt or grease can insulate the finned surfaces from the cooling effect of the chilled water flowing through the coil. Heavy accumulations can even partially block the flow of air through the coil.

   You should be able to see light from a flashlight through the coil. If not, some blockage is present and needs to be cleaned. Any insulating effect will reduce the amount of moisture that can be removed from the air, thereby increasing the humidity level for the spaces served by the cooling coil.

2) **KEEP COIL DRAIN LINES CLEAR TO ALLOW REMOVED MOISTURE TO DRAIN AWAY.**

   Also keep deck drains clear, especially in fan rooms. Any large surfaces of standing or puddling water in bilges or on decks could release moisture in the warmed air, increasing the humidity level.

3) **KEEP FILTERS, ELECTROSTATIC PRECIPITATORS AND THE INTERIOR SURFACES OF VENTILATION DUCTS CLEAN.**

   Also, make sure that ventilation diffusers are clear and are directing air for maximum personnel cooling. If blocked, the amount of airflow in or out of a space is reduced, causing temperature and humidity levels to increase.

   It is equally important to supply and exhaust the correct amount of air to prevent a build-up of contaminants or moisture in any space.

4) **SCHEDULE REPAIRS FOR MISSING OR DAMAGED THERMAL INSULATION, OR STEAM LEAKS IN PIPES OR EQUIPMENT IN ENGINE ROOM OR MACHINERY SPACES.**

   Such problems can increase temperature and humidity levels in these areas, ultimately contributing to unsafe heat-stress levels.

   (Heat stress and its measurements have been discussed in previous *deckplate* articles. The Navy policy on heat-stress monitoring and control is contained in OPNAVINST 5100.20C.)

A follow-up *deckplate* article will discuss temperature conditions for various class submarines.

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FIBER FOR THE FLEET

The average Navy cruiser contains more than 42 tons of signal cabling. This weight could be reduced to about two tons by replacing the copper cables with fiber optics. Think of the savings in installation costs alone, never mind maintenance and fuel reduction.

The use of fiber optics technology in telecommunications is steadily increasing. Optical fiber is being used instead of copper cables as a carrier for data, voice and video communications by a growing number of industries.

Applied to military weapon systems, the same technology can be invaluable. Reduced installation cost, lighter weight and increased frequency range are among the many benefits to be gained.

The Navy is rapidly pursuing various ways to apply fiber optics to its ships and aircraft.

How It Works

Fiber optics technology transfers information using glass and pulses of light. Hair-thin glass fibers carry light pulses from one place to another. Because the glass is ultra pure, very little light is lost during travel.

The technology converts an electrical signal at the transmitting end of the system into a light signal, using either a light emitting diode or a laser. The light signal is coverted back into an electrical signal when it gets to the receiver.

The pure composition of the glass allows a great deal of information to pass over the fiber. Multiplexing or networking several systems together enables the data from each system to pass over a single glass fiber, which then can replace multiple copper cables.

Benefits

Fiber optics has proven in many applications to be a less costly and more efficient means to transmit information than traditional cables.

Moreover, the small size of fiber optic cable greatly reduces the volume requirements for cableways, and the glass fiber is not affected by electromagnetic interference.

The 12-ribbon fiber optic cable on the right can replace the equivalent of the 144 copper cables on the left.

NAVSEA Efforts

A new NAVSEA Fiber Optics Program Office (SEA 56ZC) is coordinating the introduction of this technology into the fleet. Specifications have been developed for 19 fiber optic components to serve as the standard baseline for applications in specific systems.

Future Plans

The Navy is continuing to investigate numerous potential applications for fiber optics. Two of them are data transfer networks, which have a virtually unlimited capacity to carry information, and fiber optic lights, which could make fluorescent lighting obsolete aboard ship.

The potential benefits to be gained are many. NAVSEA is committed to obtaining fiber optics benefits which will ultimately increase our ship and submarine combat capability.

The following fiber optic systems already have been demonstrated aboard ship.

SYSTEM	SHIP
Propulsion Control	USS O'BANNON DD 987
Motor Control	USS O'BANNON DD 987
SPS-49 Radar	USS NIMITZ CVN 68
Voice Multiplexing	USS CONSTELLATION CV 64
Damage Control	USS MOBILE BAY CG 53
Sensors	USS AVENGER MCM 1 (planned)

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READY-MIXED RAINBOW

Sun glow, rosewood and beach sand are not the first colors that come to mind when one thinks of interior bulkheads of ships. A far more likely choice would be bulkhead gray, the Navy's number one hue.

However, eight new colors, including those above, have now been added to the Navy selection of ready-mixed paints. Inside bulkheads are painted primarily for cosmetic purposes, so why not add some attractive colors?

The enamel paints are generally applied over anti-corrosive primers, and are durable and fire retardant, as well as cosmetic.

Traditionally, there have been three basic colors used aboard ship -- soft white (Navy formula 124), pastel green (Navy formula 125) and bulkhead gray (Navy formula 126). These three are described by the military specification, DOD-E-24607, which also covers the eight other colors.

Sun glow, beach sand, rosewood and the other five colors, however, were not available as ready-mixed paint. Users had to tint a gallon of soft white paint with the appropriate tinting medium to obtain the desired color. Unfortunately, this color was never the same from one gallon to the next.

At NAVSEA's request, the General Services Administration (GSA) developed national stock numbers (NSNs) for the eight additional colors in ready-mixed paint.

The Navy and other government agencies use a federal standard color number to give users an idea what a color will look like after it is applied. This is the same idea as asking someone in a paint store to mix a special color matched to a chip in the store. The government's color chips are contained in the federal standard number 595.

Navy interior fire-retardant enamels are available as either oil-(solvent) base or water-base paints. The oil-base paints are described by specification DOD-E-24607, and the water-base paints by specification DOD-C-24596.

The *Naval Ships Technical Manual*, Chapter 631, "Preservation of Ships in Service," describes the application of interior paints. Pay close attention to the limitations placed on the application of the water- base paints.

NOTE: The first three oil-base paints are carried in stock by GSA and are available within seven days. The other eight are not stocked by GSA, since a demand hasn't yet been established. The first order will take about 30 days to fill, but subsequently, the order time should take about seven days.

No water-base paints are in stock yet, but are ordered through GSA and delivered directly by the manufacturer. The usual requisition procedures apply.

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OIL-BASE PAINTS

COLOR	COLOR NUMBER*	UNIT OF ISSUE	NATIONAL STOCK NUMBER
Soft White	27880	1 Gallon	8010-00-577-4738
		5 Gallons	8010-00-577-4739
Pastel Green	24585	1 Gallon	8010-00-577-4734
		5 Gallons	8010-00-577-4735
Bulkhead Gray	26307	1 Gallon	8010-00-577-4736
		5 Gallons	8010-00-577-4737
Sun Glow	23697	1 Gallon	8010-01-290-1948
		5 Gallons	8010-01-290-1934
Green Gray	26496	1 Gallon	8010-01-290-1949
		5 Gallons	8010-01-290-1935
Yellow Gray	26400	1 Gallon	8010-01-290-1936
		5 Gallons	8010-01-290-1937
Pearl Gray	26493	1 Gallon	8010-01-290-1938
		5 Gallons	8010-01-290-1939
Pastel Blue	25526	1 Gallon	8010-01-290-1940
		5 Gallons	8010-01-290-1941
Beach Sand	22563	1 Gallon	8010-01-290-1942
		5 Gallons	8010-01-290-1943
Rosewood	22519	1 Gallon	8010-01-290-1944
		5 Gallons	8010-01-290-1945
Clipper Blue	24516	1 Gallon	8010-01-290-1946
		5 Gallons	8010-01-290-1947

WATER-BASE PAINTS

COLOR	COLOR NUMBER*	UNIT OF ISSUE	NATIONAL STOCK NUMBER
Soft White	27880	1 Gallon	8010-01-208-1778
		5 Gallons	8010-01-208-7777
Pastel Green	24585	1 Gallon	8010-01-208-1779
		5 Gallons	8010-01-208-1780
Bulkhead Gray	26307	1 Gallon	8010-01-208-1781
		5 Gallons	8010-01-208-7778
Sun Glow	23697	1 Gallon	8010-01-209-1153
		5 Gallons	8010-01-208-7774
Green Gray	26496	1 Gallon	8010-01-209-1154
		5 Gallons	8010-01-208-1776
Yellow Gray	26400	1 Gallon	8010-01-208-1777
		5 Gallons	8010-01-208-7775
Pearl Gray	26493	1 Gallon	8010-01-208-1782
		5 Gallons	8010-01-209-3195
Pastel Blue	25526	1 Gallon	8010-01-208-7776
		5 Gallons	8010-01-209-1155
Beach Sand	22563	1 Gallon	8010-01-206-4712
		5 Gallons	8010-01-208-7772
Rosewood	22519	1 Gallon	8010-01-208-5832
		5 Gallons	8010-01-208-1774
Clipper Blue	24516	1 Gallon	8010-01-208-1775
		5 Gallons	8010-01-208-7773

* All color numbers are under the federal standard number 595

DAMAGE CONTROL UPDATE

Non-Developmental Items

Blower Replacements

WOMEN'S COVERALLS

SIZE	STOCK NUMBER
[illegible]	[illegible]

NDI INITIATIVES
Smoke Generators

Cutting Units

CORRECT HOSE FAILURES

Have you ever seen a refueling hose fail during an underway replenishment? It can be one big mess with everyone on deck sprayed with fuel. More importantly, it is hazardous.

This was not an unusual event in the past. In fact, refueling-hose failures became so common in the fleet that ships looked upon them as normal occurrences and replaced hoses on a regular basis.

Why?

For more than a year, ships experiencing problems with refueling hoses have been requested to submit deficiency material reports (DMRs; also called quality deficiency reports), in accordance with Defense Logistic Agency Regulation (DLAR) 4155.24. Analysis of these reports have revealed that internal weaknesses in the hoses are largely responsible for their failures.

No More

We no longer have to put up with frequent hose failures. In March 1988, the procurement document for all refueling-at-sea hoses was amended to ensure that their manufacturers conform to all Navy performance requirements.

The document, MIL-H-22240 Rev F Amendment 1, is being used by the Defense Construction Supply Center to purchase new hose to replace deficient stock in the supply system.

Be Alert

We must continue to monitor the reliability of refueling hoses during underway replenishments through the deficiency material reports. Whenever a hose fails, this report should be filled out and submitted in accordance with DLAR 4155.24.

When the report is received, an entry is made in the data base noting the problem. When a pattern of failure in certain hoses is detected among the entries, the manufacturer's conformance to the specification is questioned and investigated.

This system is extremely useful in filtering out undesirable manufacturers and forcing others to deliver only quality work.

FILL OUT AND FILE DEFICIENCY MATERIAL REPORTS WHEN FACED WITH REPEATED REFUELING HOSE FAILURES. IT IS THE ONLY WAY TO ASSURE TOP QUALITY PRODUCTS AND REPUTABLE MANUFACTURERS.

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THE RIGHT BOOTS

Several kinds of rubberized fire fighting boots can be found aboard ships. However, only one type is fully compatible with the fire fighter's ensemble. The correct boot is 13-1/2-inches high, conforms to MMIL-L-2885 Type II and is available in the supply system in sizes five through 15.

SIZE	STOCK NUMBER
5	8430-00-753-5935
6	8430-00-753-5936
7	8430-00-753-5937
8	8430-00-753-5938
9	8430-00-753-5939
10	8430-00-753-5940
11	8430-00-753-5941
12	8430-00-753-5942
13	8430-00-753-5943
14	8430-00-753-5944
15	8430-00-753-5945

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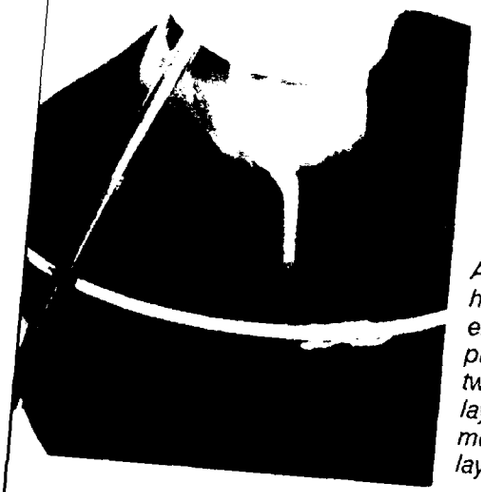
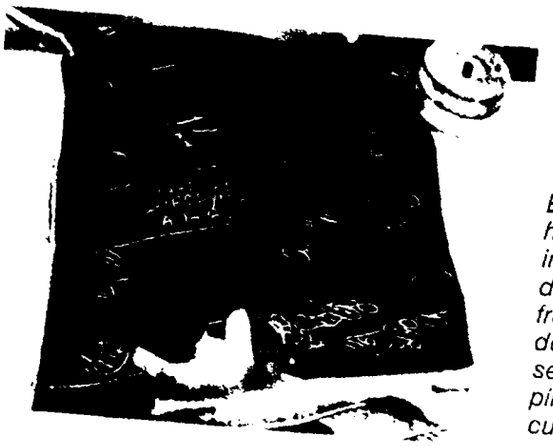


A pressure-burst test has a "ballooning" effect on a hose, pulling apart and twisting the various layers of reinforcement while the inner layer remains intact.



Brand new, this hose failed testing with 97 defects ranging from simple indentations to seams from wrapping that didn't cure properly.

There is no rubber between the yarn fibers of this hose that had suffered a burst failure.

This air entrapment mark appeared when the tube was made and wrapped. Note the depth of the seams from poor curing.

These are typical examples of excessive ozone cracking and weather deterioration on the outer cover.

The photographs here are typical failures caused when a defective hose is exposed to fuel and pressure. They will assist you in filling out the deficiency material reports.

Try to submit similar photographs with your reports to substantiate the failures. Also save failed hose sections for later submittal. It is very important to keep these failed sections until notified by the appropriate activity. These samples will allow manufacturers to perform failure analyses on their own.

There is not rubber through the yarns to help resist pressure and twisting in this typical star-burst failure (enlarged below).

Seams from wrapping did not disappear during vulcanization on this poorly cured hose. The seams are the weakest points, resulting in failure.

The seams (at left) expose the follow-on layers (below), which rapidly deteriorate when in contact with fuel. Only the tube is fuel resistant

The inner tube pushed its way through the yarns to cause a star-burst failure.

SMOKE GENERATOR DOS AND DON'TS

NAVSEA has approved the use of portable smoke generators aboard surface ships. Guidelines established for their safe and effective operation are outlined in this article.

Shipboard conditions preventing strict adherence to some of the guidelines are defined to help commanding officers determine whether smoke generators should or should not be used.

A) The generator must be operated in accordance with the manufacturer's instructions.

B) Personnel with respiratory or eye irritations must wear an air purifying respirator or an oxygen breathing apparatus (OBA), or cannot be exposed to the smoke simulant.

C) The smoke generation time must not exceed three minutes per 1,000 feet of gross compartment volume. (For example, in a space of 10,000 cubic feet, the generator should not run for more than 30 minutes.) This will give you a visibility of about three feet.

Extremely dense concentrations of smoke pose a high risk of combustion. The lower flammability limit of the smoke is 88-grams per cubic meter. On the other hand, the desired visibility (approximately three feet) has a concentration of two-grams per cubic meter.

The three-foot limit was chosen because it provides a large safety margin with respect to flammability and provides effective training.

The desired visibility can be determined by the smoke generator operator fully extending an arm in the direction the generator is pointing. As soon as the operator's hand is obscured, the correct smoke concentration is obtained. The machine should then be turned off. It can be cycled, however, to maintain the desired level of concentration.

D) The gross volume of the compartment in which the generator is used shall be between 240 to 11,500 cubic feet.

Operating the smoke generator in a space with less than 240-cubic feet of volume increases the danger of flammability. Running the generator in a space with more than 11,500-cubic feet does not produce a safety hazard, but effective smoke concentrations may not be achieved in such a large area.

E) Generators shall not be operated where the aerosol could be exposed to an open flame.

F) The temperature of the compartment shall be between 77 and 113-degrees Fahrenheit.

Operating the generator above 113-degrees Fahrenheit ambient temperature increases the potential of smoke flammability. Although such a risk is low, exposure of smoke to flame in this temperature should be prevented.

Operating the smoke generator below 77-degrees Fahrenheit increases the chances of hazardous slippery residues coating decks and railings.

G) The generator shall be operated only when the relative humidity is between 40 and 70 percent.

A slippery residue can settle on decks and railings if a smoke generator is operated in higher than 70-percent humidity. Operating the generator in less than 40-percent humidity does not produce a safety hazard.

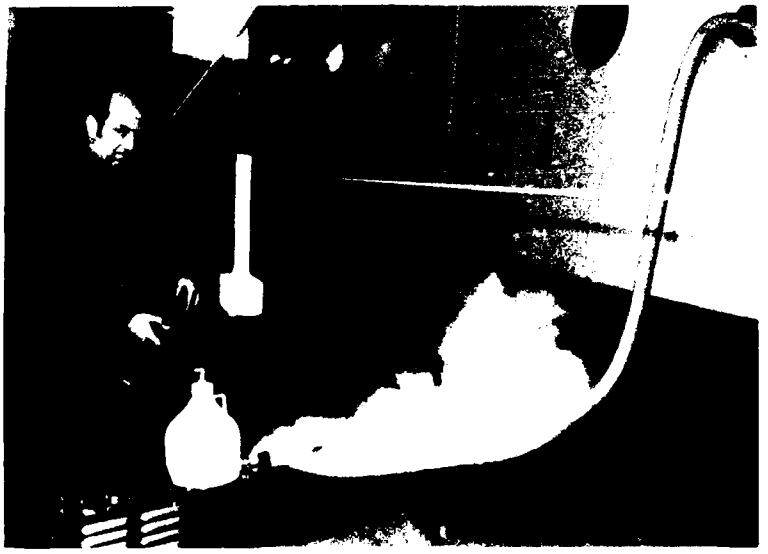
The lower humidity, however, reduces smoke concentrations, necessitating prolonged aerosol use and running time to produce sufficient smoke for training. In fact, it may not be possible to obtain adequate smoke concentrations under some conditions.

H) Ventilation and circulation fans shall be secured to maximize smoke buildup.

I) Doors and hatches, except for passageways, should be secured to maximize smoke containment.

J) There shall be normal lighting, unless damage control dictates otherwise.

K) Use only the liquid designated by the manufacturer of a generator.



Damage control trainer starts smoke generator.

Do not use any fluids with fluorocarbons (Freon, etc.) for propellants.

L) Do not use in machinery, computer, communications, electronics, avionics, live ordnance, magazines or nuclear propulsion plant spaces. Ensure that such spaces are not exposed to the smoke simulant by an exhaust that is connected to a recirculation system.

The long-term effects of smoke on shipboard equipment in these areas is not known. However, operating the generators in such spaces may damage the equipment overtime.

Until more data is available, all restrictions on using the generator in these spaces remain in effect.

M) Do not use smoke generators on submarines.

N) Do not expose aircraft to the smoke simulant.

O) Crew movements shall be planned and controlled in the smoke environment.

P) Before a smoke drill, identify and correct all potential hazards, such as fall risks, obstructions, protrusions, sharp edges, moving machinery, electrical receptacles and fire risks. For example, make sure that chains are installed, unused hatches are shut and a safety observer is posted at open hatches.

Q) If desmoking is not part of the exercise, restart the ventilation system after the drill to eliminate all traces of the aerosol.

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USE GOOD OIL

For Poratable Pumps

The two-cycle engine oil used in the P-250 MOD 1 portable pump must be of good quality or the engine could easily burn out.

Recent reports on damages to pump engines document that the oil now in the supply system does not meet the requirements of the Outboard Marine Corporation (OMC), the engine manufacturer. (This oil is carried under NSN 9150-00-117-8791.)

OMC recommends that we use their oil until our supply system stocks a suitable oil. OMC oil is available under Number 174310 from Johnson dealers or Number 174309 from Evinrude dealers. The Pennzoil equivalent is Number 93813.

Ships in the Charleston area switched to the OMC oil two months ago. Since that time, SIMA Charleston has not found any engine failures. Previously, they were seeing four or five burnt-up engines a month.

We recommend that you switch to OMC oil until the better oil is available in the supply system, which should be around October 1989 under NSN 1H 0099-LL-H20-4121.

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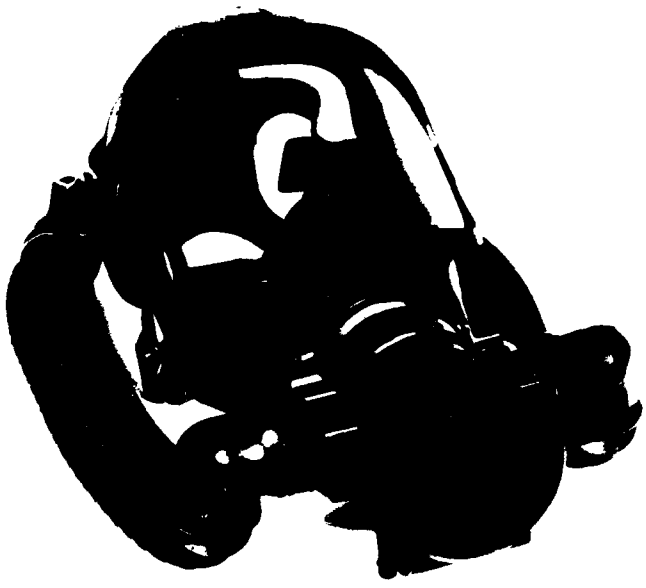

The successful voice projector set is shown mounted on an OBA mask.

TALKING THROUGH OBAs

Sailors wearing oxygen breathing apparatus (OBAs) have always had problems talking clearly to one another, even when they were close together. The OBA mask, with only a voice diaphragm, muffled and disguised the sailors' voices.

In 1978, a major breakthrough in communication was provided by a voice amplifier called the AN/PNT-1A(V)2 audio projection set. This set consists of a specially-designed speaker amplifier and a microphone mounted inside the mask in place of a voicemitter.

The speaker amplifier includes a preamplifier with pre-emphasis frequency responses that match the mask cavity acoustics. It also has a power amplifier to project the spoken voice into the surrounding area.

Flaws

While still in use, this set needs certain improvements. Mounted on the chest, the audio projector does not move as the head turns. Moreover, it weighs a little over two pounds and presses uncomfortably against the chest. The unit also obstructs the OBA timer and its installation requires the OBA voice diaphragm to be removed. Therefore, there is no backup for the voice amplifier.

The set is satisfactory in situations such as investigations, however, investigators find it very cumbersome when passing through scuttles.

Steps Taken

In 1986, NAVSEA requested that the Naval Research Laboratory evaluate commercially-available, industrial-grade amplifier units and recommend a replacement for the AN/PNT-1A(V)2. It was hoped that a device already on the market could be used by the Navy.

Amplifiers from seven companies were tested at the Fleet Training Center Fire Fighting School, Norfolk, VA. Unfortunately, however, none of them proved to be acceptable. It began to look like an entirely new model amplifier would have to be developed.

Success

In late 1987, another company demonstrated a prototype of a gas mask voice amplifier which could be modified for use on an OBA. When the modifications were made, 12-hand-built units were purchased and sent through three cycles of tests. (This is another example of NDI acquisitions.)

Modifications were made after each cycle, including the addition of a convenient snap-on/snap-off face mask and a battery that is easy to change while the set is in use.

Today, prototype voice projector sets have successfully passed all operational and environmental tests at the Norfolk Fire Fighting School. They were also deployed for several months aboard USS MOOSBRUGGER (DD 980) and tested at the fleet training group in Little Creek, VA. All users of the new unit agree that it is a winner.

Advantages of the new voice projection unit over the AN/PNT-1A(V)2 set include the following.

1. The audio quality is equal to or better than the existing unit.
2. The entire unit mounts on the front of the OBA face mask.
3. The OBA voice diaphragm is not replaced or modified.
4. The unit can easily be removed from one mask and mounted on another.
5. The amplified voice is projected in the direction that the user is facing.
6. The unit weighs about 10 ounces, which is less than half that of the older set.

Availability

The Navy is now preparing to buy about 6,000 units of the new amplifiers. Distribution to the fleet should start in 1991.

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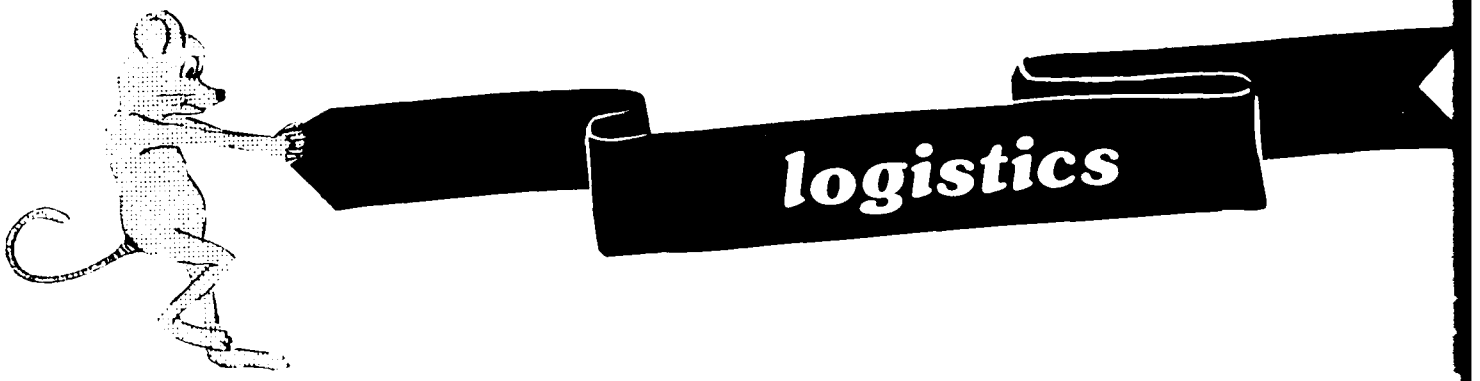
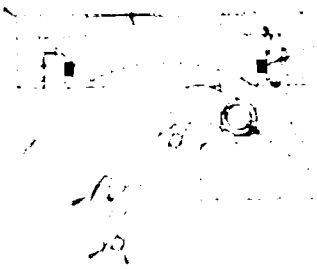


NEW STANDARD VALVES



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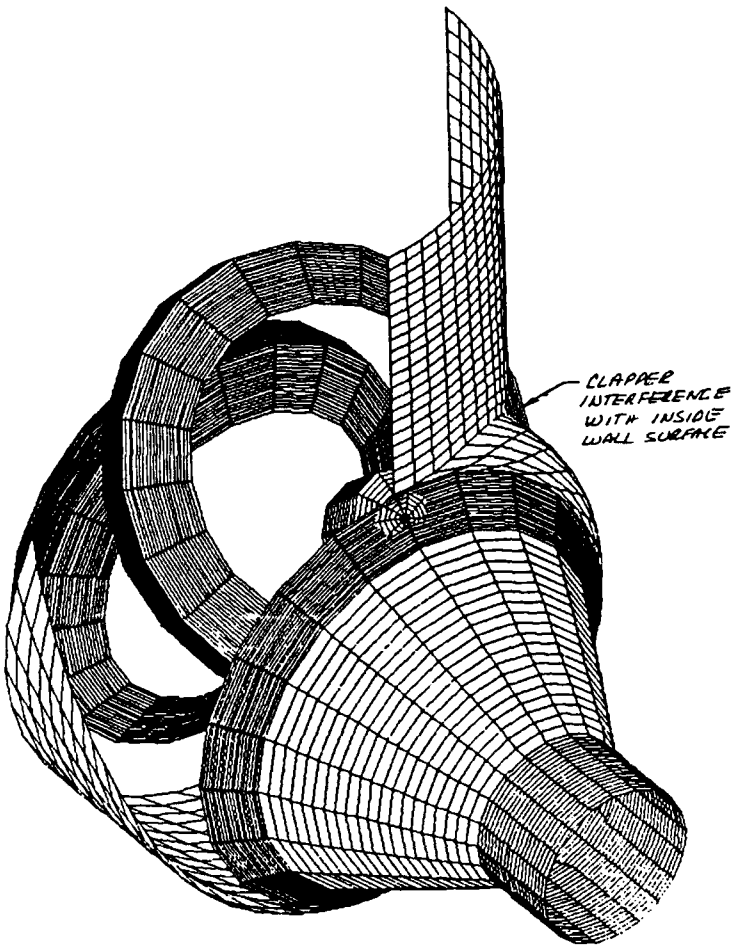


New standard swing check valve design.

Design

The major effort of the standardization project concerned design. Many existing valves were evaluated for the advantages and disadvantages of their designs.

The decision was made to eliminate the 3/8 and 1-1/4 inch sizes because they are considered nonstandard by industry. Only socket weld, flanged and flanged with o-rings are acceptable end connections. Flow passages had to be designed to accommodate schedule-40 pipe.

It was also decided to increase the number of interchangeable parts. Internal parts became interchangeable within two groups (1/4 to one inch and 1-1/2 to two inch). This reduced the number of dies needed with the forged body design.

In contrast, numerous molds were required for previous casting methods. The only difference in the grouped parts is the bore diameter.

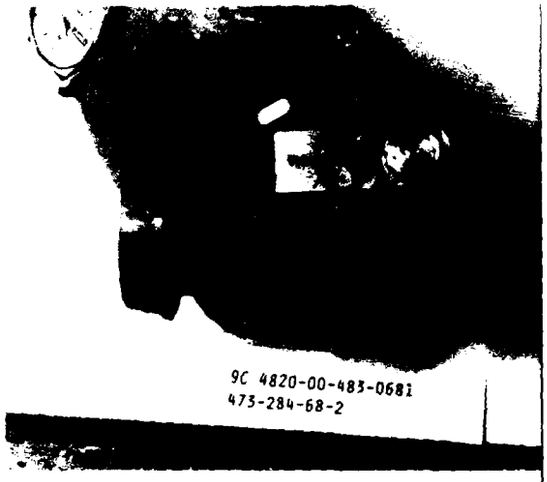
Another decision was made to increase the ease of maintenance. Traditionally cast into the body of the valve, the pin mounts were moved into the valve cap. Therefore, when the cap nut is removed, all the internal parts are extracted with the cap so that repairs can be made outside the valve. Thus, the valve body is less complex.

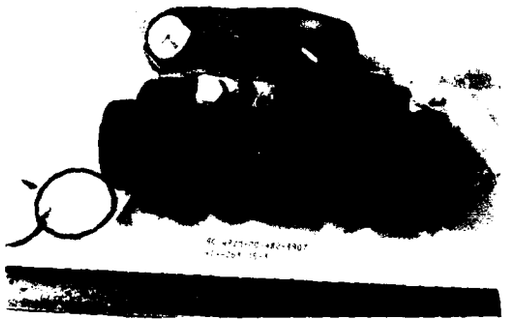
The number of pieces in the valve was reduced and certain connections were simplified. A polymeric material was used in the bumper and bushings of the pin connection to eliminate metal-to-metal contact, thus reducing the noise level.

A number of design improvements have been incorporated into the standard valve which aid the sailor in shipboard installation and maintenance. They include an elongated hole for the clapper pin which allows for minor misalignment of the clapper. The cap nut now has slots for installation, eliminating the need for a torque wrench. And a pressure-seal design for the o-ring grove alleviates current leakage problems.

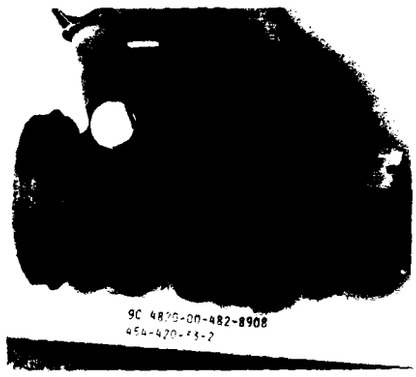
Manufacturing

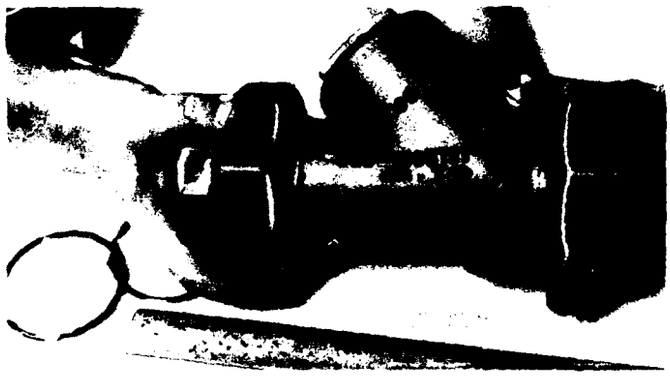
The Logistics Center also attempted to resolve potential incompatibilities between the engineering and manufacturing processes, and to give manufacturers a chance to participate in the standardization effort. Some of their suggestions were incorporated into the final design.





The new design can replace all these different valves and nearly 1,000 more.





An important outcome of this shared effort was the decision to increase the diameter of the top of the valve opening. If the valve is cast, this is not important. If the valve is forged, however, its internal size or cavity is limited by the size of its top opening.

With the larger opening, additional machining isn't necessary to complete the valve cavity, thus saving manufacturing costs.

Another manufacturing concept used in the design concerns the actual forging dies. Previously, each valve size required two sets of dies, one for the flanged and another for the socket-weld type of end connections. With the standard valve, only one die set is required for either type of connections for each size group. This simplification will bring about significant cost savings.

Additional feedback is expected from industry after a prototype is procured.

Future Tasks

Before shipboard installation, a prototype must be manufactured and tested, and at least three sources of supply must be qualified. It is hoped that this will be completed by the middle of FY 1991.

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A crewman aboard the USS SARATOGA (CV-60) checks fire fighting equipment, which is subject to configuration accounting.

CLOSING A LOOP

In Accountability

For years, the Navy functioned fine with a box of repair parts stowed near the gear and a locker full of battle spares. This was before the days of "configuration accounting," when ships were less sophisticated than they are now.

Today, configuration accounting, that is keeping track of everything on board, is a very critical, complex task. Failure to enter a change in equipment in a ship's configuration records can result in missing repair parts and technical data, downed equipment, degraded mission capabilities -- and even dead ships.

ACCURATE CONFIGURATION ACCOUNTING IS NOT JUST "NICE TO HAVE," IT IS AN ABSOLUTE NECESSITY.

Policy

The Navy Configuration Management Policy (SECNAVINST 4130-2) provides directions on how to maintain records of shipboard equipment and systems, and defines the items to be recorded.

Background

Until recently, the Navy's configuration accounting system consisted of loosely connected units without central control.

NAVSEA kept records on what equipment was supposed to be on board, and NAVSUP kept track of that equipment and its repair parts in a central repository called the weapon systems file. The Ships Parts Control Center (SPCC) kept this file or data base. While the ship was operational, the shipboard maintenance people reported equipment changes onboard to NAVSEA on a multi-page, hand-written form.

Just before an availability, a validation team physically checked equipment onboard against configuration records, notifying SPCC of any changes to the data base. SPCC then corrected errors in the weapon systems file identified during validation, added planned new equipment and deleted equipment scheduled to be removed during the overhaul.

During overhaul, the shipyard kept track of what was supposed to go aboard and what actually made it. Ship personnel "cleaned house," off loading repair parts, tech manuals and other items no longer needed. They also identified and ordered missing parts and technical data for existing equipment. [These "self-help" reviews are called Integrated Logistics Overhauls (ILOs).]

All these scattered efforts -- SPCC's weapon system files, ship-generated reports, validation team findings, availability-reported changes and ILO reviews -- were the basic units the Navy used to maintain its configuration accounting system. Often the left hand was unaware of what the right was doing, which didn't always add up to accuracy.

Evolution

The concept of the Ships Configuration and Logistics Support Information System (SCLSIS) gradually evolved to fill long-standing fleet needs.

In the late 1970s, NAVSUP sought faster, bigger and more efficient mainframes to replace the early 1960s' vintage hardware at SPCC.

The original weapon system file was designed as a supply-oriented data base. NAVSEA began to redesign it by downloading the technical specifications of all ship equipment into a separate file called the Ships Configuration and Logistics Index (SCLSI). (This new file contains additional elements to comply with SECNAVINST 4130.2.)

The SCLSI is designed using a hierarchical code, describing the functions of the equipment, not the equipment itself. For example, a pump needed for the salt water system could be made by Reliance, Worthington or another manufacturer, but its function is the same.

This code allows the record for a specific piece of equipment to be changed without altering its function. It also shows the relationship between pieces of equipment, such as the motor running the pump in the salt water system.

In The '80s

In the early 1980s, the ships non-tactical automated data processing program (SNAP) was introduced to the fleet, enabling ships to maintain vital records in a computer, instead of on hand-written forms. It allowed maintenance actions, repair part use and configuration changes to be reported automatically.

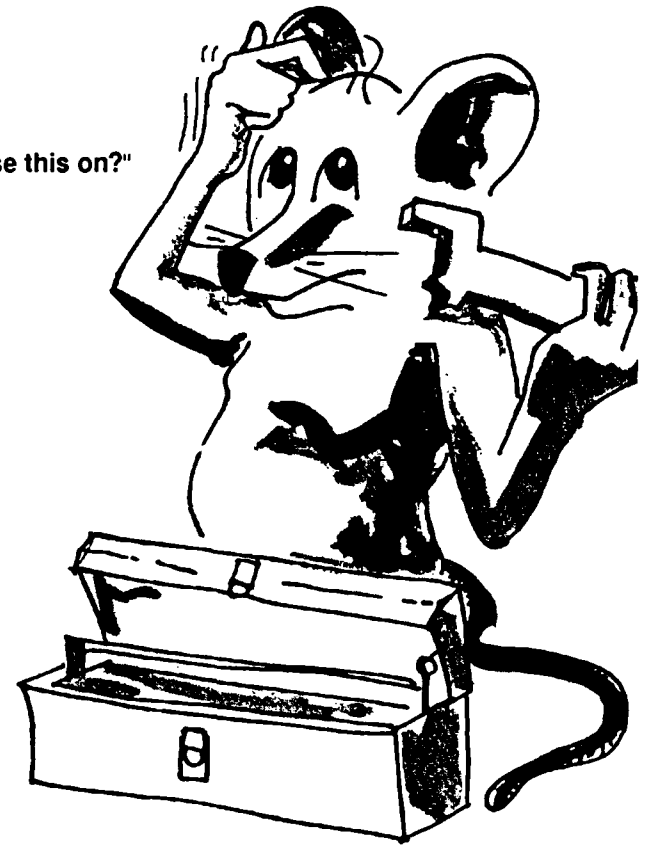
Workers secure a caisson to a dry dock at Long Beach Naval Shipyard during a ship overhaul.

The problem, however, was in keeping the shipboard data base in sync with the central Navy data base at SPCC. All SNAP updating had to be done manually, keystroked into the computer from hardcopy information. This was a tremendous resource burden to the ship.

In late 1987, new SNAP II software made it possible to update shipboard computer data bases with tapes generated by the SCLSI and the weapon systems file at SPCC.

In turn, changes to the configuration records and other files are automatically generated by SNAP II to update the SCLSI and the weapon systems file.

"What do I use this on?"



Conclusion

By early 1988, the links finally began to form a chain. Many ships had been automated, upgraded hardware had been obtained and a system of data management programs was being developed that could maintain configuration information accurately.

The Navy is approaching an automated configuration accounting system that can tie all of the units together and provide an automated linkage from the central data file to the fleet. In fact, the fleet should see accurate automated accounting by the year 2,000, thereby closing the loop.

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combat systems

SURGE AND FALLOUT

Slick

Crack

Spray Dome

The spray dome is a column of spray that appears in the middle of the crack just over the point of burst. This occurs because the force of the blast breaks up the surface water and forces it into the air in the form of spray.

Plume

Base Surge.

The cloud that moves quickly outward from the bottom of the column is the "base surge." For an underwater burst, this is a dense, visible cloud of water droplets similar to the spray produced by a very large waterfall.

Radiation Pool

The radioactive cloud or base surge becomes doughnut-shaped, and a "radiation pool" forms beneath it. This pool is contaminated and is moved by ocean currents.

Although both the base surge and radioactive pool movements are easily predicted, the base surge cloud is the more dangerous, because it moves much faster.

The base surge dissipates and becomes invisible after about ten hours, depending on weather conditions. Rain and snow help remove the radioactive particles from the atmosphere. Therefore, ships and aircraft should avoid rain or snow squalls after an underwater burst.

Safeguards

The best way to elude contamination is by taking evasive action. Whether in an aircraft, submarine or surface vessel, leave the base surge area as soon as possible after the initial shock.

- Stay clear of contaminated water pools.
- Avoid any potentially radioactive precipitation.
- Initiate both Circle William and water washdown operations to keep contamination to a minimum.
- Follow damage control decontamination procedures.

For More Information

Among the sources of information on base surge and fallout are: *Nuclear Warfare Operations* [NWP28(E)], *The Effects of Nuclear Weapons* by Gladstone and Dolan, the series *Navy Nuclear Notes*; and the series of Theater Nuclear Warfare Instructional Modules, including O34 and E 26 on base surge, and O35 and E27 on fallout.

Audiovisual material available includes the CNO Theater Nuclear Warfare Awareness series, consisting of the films "Nuclear Weapons Effects at Sea" (35244DN), released in 1985, and the Nuclear Weapons and Their Effects video series, including "Base Surge Fallout" (802984DN), which will be released later this year.

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(Left) A radioactive cloud forms during first stages of the base surge.

(Below) A hollow column is topped by a late stage of the condensation cloud.

PORTABLE TOWERS ALIGN ANTENNAS

When surface missile system ships were introduced to the fleet in the 1950s, their fire-control radar antennas had to be aligned to ensure that the radio frequency (RF) beams were parallel to the optical line-of-sight. Until recently, permanent collimation towers performed all such alignments at various naval shipyards and stations.

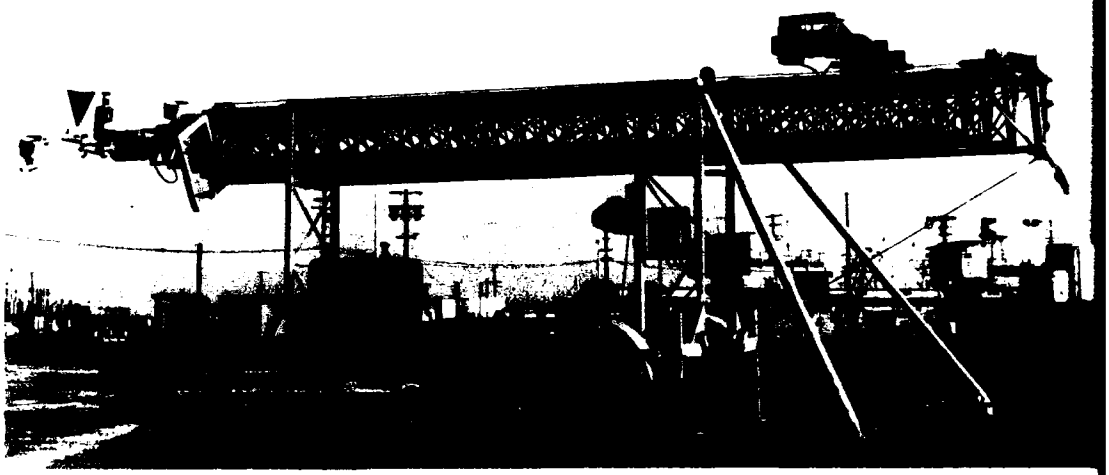
After ensuring the proper RF to optical beam, these fixed towers also checked the strength and density of the signals, along with angle sensitivity, phasing and frequency.

These telescopic towers fold up for storage and transport on an 18-ft open dual-axle trailer. A self-contained 7,000-watt gasoline generator supplies the electrical power necessary to raise and lower a tower, and operate all test equipment used during alignments.

The test equipment and operator are housed in the enclosed rear of the tow vehicle, which transports the tower.

These features, along with a complete supply of off-the-shelf, state-of-the art test equipment, make it possible to provide collimation services to ships located practically anywhere in the world.

(Next Page) This tower is erected for its alignment work.



Portable collimation tower is shown folded up for transport aboard an 18-ft open dual-axle trailer.

Problems

The permanent towers require ships to be positioned in certified berths with clear unobstructed lines-of-sight to the shipboard radar antennas. Often, ships have to be repositioned to allow access to berths. These relocations are expensive, time-consuming and disruptive to normal pier-side activities.

Solution

New portable collimation towers eliminate the need for repositioning, because they can be set up almost anywhere to support nearly all types of alignment requirements.

Availability

By FY 1990, there will be nine portable towers available to provide collimation services to the fleet.

NAVAL SEA SUPPORT CENTER PORTABLE TOWERS

ATLANTIC	PACIFIC
1. Mayport, FL	4. San Diego, CA
2. Norfolk, VA	5. Long Beach, CA
3. Pascagoula, MS	6. Pearl Harbor, HI

NAVAL SHIP WEAPON SYSTEMS ENGINEERING STATION TOWERS

7. Bath, ME
8. & 9. Port Hueneme, CA

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